

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

## PCT

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**  
(PCT Rule 43bis.1)

Date of mailing  
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference  
see form PCT/ISA/220

**FOR FURTHER ACTION**  
See paragraph 2 below

International application No.  
PCT/EP2004/050595

International filing date (day/month/year)  
23.04.2004

Priority date (day/month/year)  
24.04.2003

International Patent Classification (IPC) or both national classification and IPC  
H04B10/17, H01S3/30

Applicant  
CONSORZIO NAZIONALE INTERUNIVERSITARIO PER LE ...

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**International application No.  
PCT/EP2004/050595

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**Box No. I Basis of the opinion**

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1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
  - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material:
    - ☐ a sequence listing
    - ☐ table(s) related to the sequence listing
  - b. format of material:
    - ☐ in written format
    - ☐ in computer readable form
  - c. time of filing/furnishing:
    - ☐ contained in the international application as filed.
    - ☐ filed together with the international application in computer readable form.
    - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
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**Box No. II Priority**

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1. ☒ The following document has not been furnished:

☒ copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).

☐ translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

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**Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	1-19
	No: Claims	
Inventive step (IS)	Yes: Claims	1-19
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-19
	No: Claims	

2. Citations and explanations

**see separate sheet**

**Re Item V.**

- 1 The following documents are referred to in this communication:

D1 : US 2002/097481 A1

D2 : Eiselt M et al Optical Society of America / Institute of Electrical and Electronics Engineers: "Raman induced cross talk with PRBS modulation" Optical Fiber Communication Conference. (OFC). Postconference Digest. Atlanta, GA, March 23 - 28, 2003, Trends in Optics and Photonics Series. (TOPS), Washington, DC : OSA, US, vol. TOPS. VOL. 86, 23 March 2003 , pages 334-335, ISBN: 1-55752-746-6

- 2 Document D1, which is considered to represent the most relevant state of the art, discloses (in Figures 4 and 12) the reduction of relative intensity noise RIN in a WDM Raman optical amplifier by de-correlating the input signals.

From this, the subject-matter of independent claims 1, 3 and 12 differs in that the longitudinal modes of the pump radiation are de-correlated before being coupled into the transmission fibre.

- 2.1 The subject-matter of claims 1, 3 and 12 is therefore novel (Article 33(2) PCT).  
The problem to be solved by the present invention may be regarded as:

How to prevent accumulation of spontaneous ASE noise due to non-linear parametric gain interaction between pump radiation and ASE noise propagating in the pump direction.

- 2.2 The solution to this problem proposed in claims 1, 3 and 12 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

None of the cited prior art documents provide any hint to this solution and it is not considered as obvious to the skilled person.

- 2.3 Claims 2, 4-11 and 13-19 are dependent on claims 1, 3 and 12 respectively and as such also meet the requirements of the PCT with respect to novelty and inventive step.